25. [illegible], Jul. [illegible], 1983, Thick film conductor compositions; Kumaran M. Nair, 106/1.14, 1.15, 1.19, 1.21; 252/514 [IMAGE AVAILABLE]

26. 4,381,945, May 3, 1983, Thick film conductor compositions; Kumaran M.
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01 MAR 94 13:32:12 U.S. Patent & Trademark Office P0010
Nair, 106/1.14, 1.15, 1.19, 1.21, 1.25; 252/514, 520; 501/42 [IMAGE AVAILABLE]

27. 4,120,758, Oct. 17, 1978, Production of powder metallurgy alloys; Ralph E. Rippere, 419/1; 205/74, 103, 145, 149 [IMAGE AVAILABLE]

28. 4,046,643, Sep. 6, 1977, Production of multi-metal particles for powder metallurgy alloys; Ralph E. Rippere, 205/103; 204/223; 205/74, 104, 145 [IMAGE AVAILABLE]

29. 3,839,093, Oct. 1, 1974, LEAD SEALED-THROUGH CONNECTION; Claude E. Twogood, et al., 429/185; 411/82; 429/183 [IMAGE AVAILABLE]

30. 3,773,628, Nov. 20, 1973, METHOD OF MAKING A LEAD ASSEMBLY; Akira Misawa, et al., 205/122; 156/656, 664; 174/52.4 [IMAGE AVAILABLE]

31. 3,680,190, Aug. 1, 1972, PROCESS OF MAKING DECORATIVE OBJECTS; Marie E.
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01 MAR 94 13:32:38 U.S. Patent & Trademark Office P0011
Lorch, 29/160.6; 228/182, 234.1, 262.9; 428/15, 16, 920 [IMAGE AVAILABLE]

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(FILE 'USPAT' ENTERED AT 13:22:12 ON 01 MAR 94)
SET PAGELENGTH 19
SET LINELENGTH 78
L1 7228 S (AG OR SILVER) (P) (CU OR COPPER) (P) (SN OR TIN)
L2 998 S L1 AND SOLDER
L3 31 S L2 AND [illegible]B OR LEAD) (3A) FREE

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Ø1 MAR 94 13:26:Ø9 U.S. Patent & Trademark Office PØØØ4

272Ø2Ø LEAD
655330 FREE
2624 (PB OR LEAD) (3A) FREE
L3 31 L2 AND (PB OR LEAD) (3A) FREE

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1. 5,229,Ø7Ø, Jul. 2Ø, 1993, Low temperature-wetting tin-base solder paste; Cynthia M. Melton, et al., 42Ø/557; 148/24; 228/2Ø7; 42Ø/559 [IMAGE AVAILABLE]

2. 5,221,Ø38, Jun. 22, 1993, Method for forming tin-indium or tin-bismuth solder connection having increased melting temperature; Cynthia M. Melton, et al., 228/18Ø.22, 197 [IMAGE AVAILABLE]

3. 5,121,871, Jun. 16, 1992, Solder extrusion pressure bonding process and bonded products produced thereby; Leonard C. Beavis, et al., 228/123.1, 13:28:Ø3 COPY AND CLEAR PAGE, PLEASE

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Ø1 MAR 94 13:28:52 U.S. Patent & Trademark Office PØØØ5

198 [IMAGE AVAILABLE]

4. 5,1Ø2,748, Apr. 7, 1992, Non-leaded solders; Thomas E. Wylam, et al., 428/647; 42Ø/56Ø [IMAGE AVAILABLE]

5. 5,Ø74,92Ø, Dec. 24, 1991, Photovoltaic cells with improved thermal stability; Ronald C. Gonsiorawski, et al., 136/244, 256; 228/179.1; 437/2, 18Ø, 2Ø5, 2Ø9 [IMAGE AVAILABLE]

6. 5,Ø49,718, Sep. 17, 1991, Method of laser bonding for gold, gold coated and gold alloy coated electrical members; Philip J. Spletter, et al., 219/121.64, 121.85 [IMAGE AVAILABLE]

7. 5,008,512, Apr. 16, 1991, Method of laser bonding electrical members; Phillip J. Spletter, et al., 219/121.64, 121.75 [IMAGE AVAILABLE]

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01 MAR 94 13:29:27 U.S. Patent & Trademark Office P0006

8. 4,929,423, May 29, 1990, Low toxicity alloy compositions for joining and sealing; Kay L. Tucker, et al., 420/561; 148/25; 228/262.9 [IMAGE AVAILABLE]

9. 4,879,096, Nov. 7, 1989, Lead- and antimony-free solder composition; Paul E. Naton, 420/561; 228/262.61 [IMAGE AVAILABLE]

10. 4,879,094, Nov. 7, 1989, Cu--Sn--Zn--Bi alloys; William Rushton, 420/476, 475 [IMAGE AVAILABLE]

11. 4,845,335, Jul. 4, 1989, Laser Bonding apparatus and method; Daniel M. Andrews, et al., 219/121.63, 121.84 [IMAGE AVAILABLE]

12. 4,806,309, Feb. 21, 1989, Tin base lead-free solder composition containing bismuth, silver and antimony; Stanley Tulman, 420/562, 561 [IMAGE AVAILABLE]

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01 MAR 94 13:30:13 U.S. Patent & Trademark Office P0007

13. 4,801,203, Jan. 31, 1989, Detector of impurities in molten solder; Shigeo Harada, 356/237; 228/104 [IMAGE AVAILABLE]

14. 4,778,733, Oct. 18, 1988, Low toxicity corrosion resistant solder; Alfonso T. Lubrano, et al., 428/647; 420/560; 428/675 [IMAGE AVAILABLE]

15. 4,758,407, Jul. 19, 1988, Pb-free, tin base solder composition; Richard E. Ballentine, et al., 420/560, 561 [IMAGE AVAILABLE]

16. 4,695,428, Sep. 22, 1987, Solder composition; Richard E. Ballentine, et al., 420/561, 560 [IMAGE AVAILABLE]

17. [illegible], Jan. 26, 1987, Surface mounted system for leaded semiconductor devices; Premkumar Hingorany, 257/696; 29/827, 840; 174/52.4; 257/779; 361/771, 773 [IMAGE AVAILABLE]

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01 MAR 94 13:31:00 U.S. Patent & Trademark Office P0008

18. 4,670,217, Jun. 2, 1987, Solder composition; Robert M. Henson, et al., 420/562 [IMAGE AVAILABLE]

19. 4,460,450, Jul. 17, 1984, Coated valve metal anode for the electrolytic extraction of metals or metal oxides; Konrad Koziol, et al., 204/290F [IMAGE AVAILABLE]

20. 4,459,166, Jul. 10, 1984, Method of bonding an electronic device to a ceramic substrate; Raymond L. Dietz, et al., 156/89; 106/1.13, 1.14, 285; 156/325; 252/514; 257/676, 783; 361/760; 428/208, 209, 210, 448; 501/19, 20, 22, 75, 76 [IMAGE AVAILABLE]

21. 4,436,785, Mar. 13, 1984, Silver-filled glass; Raymond L. Dietz, et al., 428/427; 257/676, 783; 361/783; 428/209, 210, 428, 433, 434, 446, 450, 701, 702; 501/19 [IMAGE AVAILABLE]

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01 MAR 94 13:31:34 U.S. Patent & Trademark Office P0009

22. 4,416,932, Nov. 22, 1983, Thick film conductor compositions; Kumaran M. Nair, 428/209; 427/58, 63, 126.2, 126.5, 261, 266; 428/210, 323, 325, 469 [IMAGE AVAILABLE]

23. 4,415,116, Nov. 15, 1983, Soldering tool with resilient hold-down attachment and method of using same; W. Jack Norton, 228/180.21; 219/230; 228/51, 212 [IMAGE AVAILABLE]

24. 4,401,767, Aug. 30, 1983, Silver-filled glass; Raymond L. Dietz, et al., 501/19; 106/1.13, 1.14, 285; 156/325; 252/514; 257/676, 783; 361/779, 783; 428/208, 209, 210, 448; 501/20, 22, 75, 76 [IMAGE AVAILABLE]

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Ø1 MAR 94 13:44:Ø4 U.S. Patent & Trademark Office PØØ24

US PAT NO: 4,778,733 [IMAGE AVAILABLE] L4: 1Ø of 16

US PAT NO: 4,758,4Ø7 [IMAGE AVAILABLE] L4: 11 of 16

ABSTRACT:
A lead free, cadmium free tin and tin/antimony based solder alloy having a wide melting range for joining copper tubes and brass pipe and fittings. The non-toxic tin based solder composition has a range of 92.5-96.9% tin, 3.Ø-5.Ø% copper, Ø.1-2.Ø% nickel and Ø.Ø-5.Ø% silver. The non-toxic tin/antimony based solder composition has a range of 87.Ø-92.9% tin, 4.Ø-6.Ø% antimony, 3.Ø-5.Ø% copper, Ø.Ø-2.Ø% nickel and Ø.Ø-Ø.5% silver and is especially suited for plumbing applications having tight loose fitting solder joints which are exposed to potable water.
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L1	7228	S (AG OR SILVER) (P) (CU OR COPPER) (P) (SN OR TIN)
L2	998	S L1 AND SOLDER
L3	31	S L2 AND (PB OR LEAD) (3A) FREE
L4	16	S L3 AND ((AG OR SILVER) (4A) (CU OR COPPER) (4A) (SN OR TIN)

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